

REMARKS

Claims 1-18 are all the claims pending in the application. By this Amendment, Applicants amend claims 1, 4, 5, 8, 11, 12 and add claims 15-18 to clarify the invention. Support for amendments and new claims might be found in the specification, for example, on page 8, lines 2-5, page 11, lines 15-23, page 12, lines 4-27, page 13, lines 25-27. No new subject matter has been entered.

Claims 1-3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Senda (U.S. Patent Application Publication No. 2002/0008439) in view of Honda ("Class D Audio Amplifier Design"), and further in view of Ishii (U.S. Patent Application Publication No. 2006/0132231).

Claims 4-7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Senda in view of Honda, further in view of Ishii, and further in view of Nakano (U.S. Patent Application Publication No. 2002/0033322).

Claims 8-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Senda in view of Honda, further in view of Ishii, and further in view of Katsumi (JP Patent Document No. 2001-355574).

Claims 11-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Senda in view of Honda, further in view of Ishii, further in view of Nakano, and further in view of Katsumi.

Statement of the Substance of the Interview

Applicants gratefully acknowledge an opportunity given by Examiner Rosenau to discuss claims 1 and 4 in view of the cited prior art, via a teleconference on October 8, 2008. As a result of the interview, it is Applicants' understanding that claim 1 amended to define low and high voltage would overcome the rejection over the cited prior art. It is also Applicants' understanding that claim 4 amended to recite "increasing the signal amplitude of said sine wave oscillation means when the temperature of said heat-generating body is increased and decreasing

the signal amplitude of said sine wave oscillation means when the temperature of said heat-generating body is decreased, based on the sensed temperature” would overcome the rejection over the cited prior art.

Claims 1-3 Distinguish over Cited Prior Art

Claims 1-3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Senda in view of Honda, and further in view of Ishii.

Claim 1 recites among other elements: “a voltage-boosting means for converting a low-voltage power supply of approximately 12VDC or less to a high voltage from approximately 140VDC to approximately 280VDC.”

1. Senda does not describe an amplification means driven by high voltage from approximately 140VDC to approximately 280VDC

Senda describes a D/A converter that converts a digital output signal from a CPU into a voltage output. A VCO 104 outputs a periodic voltage corresponding to the output voltage of the D/A converter that serves as an input to an amplifier. [¶ 0040] As known in the art, an electronic circuit board is not capable of outputting high voltage. Therefore, CPU clearly outputs a low voltage signal which drives the amplifier. Senda does not teach or suggest driving the amplifier with high voltage from approximately 140VDC to approximately 280VDC as recited in claim 1.

2. Senda does not describe driving the motor with high voltage from approximately 140VDC to approximately 280VDC

Senda describes an amplifier that amplifies the periodic voltage from the frequency divider 105 to a voltage and current capable of driving a vibration motor. [¶ 0041] As known in the art, the vibration motor requires a low voltage, in the range of 1-5V. Therefore, Senda drives the vibration motor with the low voltage, as required by the motor spec. Nowhere does Senda teach or suggest driving the vibration motor with high voltage from approximately 140VDC to approximately 280VDC as recited in claim 1.

3. Ishii does not describe converting a low-voltage power supply of approximately 12VDC or less to a high voltage from approximately 140VDC to approximately 280VDC

Ishii describes a power amplifying apparatus including a step-up converter 100. I.e., the voltage of the battery is stepped up and converted by the step-up converter 100 to supply the output as the power supply voltage V_c . [¶ 0036] In Figs. 4a and 4b, Ishii demonstrates characteristic diagrams obtained by simulating an effect of distortion compensation for the output signal V_o by the variation of the power supply voltage V_c in the power amplifying apparatus. [¶ 0136] The two diagrams show the power supply voltage V_c of about 5V. Therefore, Ishii's power amplifying apparatus accepts as an input a voltage of about 5V. Ishii does not teach or suggest "a voltage-boosting means for converting a low-voltage power supply of approximately 12VDC or less to a high voltage from approximately 140VDC to approximately 280VDC." To the extent Ishii discloses the voltage conversion, low voltage is converted to low voltage of a different value, as for example, a 1.5VDC battery voltage to 5VDC voltage.

Honda does not cure any deficiencies of Senda and/or Ishii.

Because neither Senda, Honda, nor Ishii, taken singularly or in combination, teaches or suggests at least "a voltage-boosting means for converting a low-voltage power supply of approximately 12VDC or less to a high voltage from approximately 140VDC to approximately 280VDC, and an amplification means driven by high voltage generated by said voltage-boosting means for amplifying the signal supplied as output from said sine wave oscillation means and for driving said piezoelectric element by a high-voltage sine wave," **claim 1** distinguishes patentably and unobviously over Senda, Honda, and Ishii.

Claim 2 recites, among other elements: "control means for implementing variable frequency control over three or more different frequencies at the time of activation of said sine wave oscillation means."

The Examiner asserts that the control device of Senda adjusts the frequency of the motor based on the motor temperature at all times, and therefore would perform the temperature control

at the time of activation of the sine wave oscillation means. (See Office Action, page 7, #16).

The Examiner is incorrect.

Senda describes operation of the control device (particularly the CPU 102) with reference to the flow chart in FIG. 5:

In step 501, the temperature of the vibration type motor 107 is measured by the temperature sensor 112.

In step 502, maximum speed data is read out from the memory in the CPU 102 on the basis of the measured temperature.

In step 503, a target lens position indicated by the command signal generator 101 is read.

In step 504, a current lens position is read by the encoder 109.

In step 505, a target speed pattern (V_o) shown in FIG. 15 is calculated and formulated from the target position, current position, and maximum speed data.

In step 506, a start-up frequency f_o (highest frequency at the right end of the hilly graph in FIG. 2) of the vibration motor is set.

In step 507, the vibration motor is turned on, and the frequency is gradually decreased to increase the motor rotational speed.

Therefore, the initial start up frequency is set based on the speed pattern, which is calculated based on the current motor temperature, current lens position and target lens position. The power is provided to the circuit and to the oscillator while the calculations and measurements are made, e.g., before the motor is turned. **Senda** does not teach or suggest adjusting the frequency when the sine wave oscillator is activated at the power up, when the power is first applied to the circuit. Moreover, **Senda** does not teach or suggest providing variable frequency control over three or more different frequencies when the sine wave oscillator is activated at the power up.

Because neither **Senda**, **Honda**, nor **Ishii**, taken singularly or in combination teaches or suggests at least “control means for implementing variable frequency control over three or more

different frequencies at the time of activation of said sine wave oscillation means,” **claim 2** distinguishes patentably and unobviously over Senda, Honda, and Ishii.

Claim 3 recites features similar to, although not necessarily coextensive with, the features argued above with respect to claim 2. Therefore, arguments presented with respect to claim 2 are respectfully submitted to apply with equal force here. It is respectfully submitted that **claim 3** distinguishes patentably and unobviously over Senda, Honda, and Ishii, taken singularly or in combination.

Claims 4-7 Distinguish over Cited Prior Art

Claims 4-7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Senda in view of Honda, further in view of Ishii, and further in view of Nakano.

Claim 4 recites, among other elements: “a control means for one of increasing the signal amplitude of said sine wave oscillation means when the temperature of the heat-generating body is increased and decreasing the signal amplitude of the sine wave oscillation means when the temperature of said heat-generating body is decreased, based on the sensed temperature.”

Nakano describes a temperature sensor that measures the temperature of the piezoelectric element. Where the output from the temperature sensor is lower than the prescribed value, the controller increases the amplitude of the drive voltage or the drive frequency, and where the output from the temperature sensor equals or is higher than the prescribed value, the controller reduces the amplitude of the drive voltage or the drive frequency. [¶ 0017]

Therefore, Nakano measures the temperature of the *piezoelectric element* and increases the voltage amplitude or frequency when the temperature is low and decreases the voltage amplitude or frequency when the temperature is high. To the contrary, claim 4 calls for the voltage amplitude to be increased when the sensed temperature is high and decreased when the sensed temperature is low. Moreover, claim 4 calls for a temperature sensor to measure the temperature of a *heat-generating body* and not the piezoelectric element itself. Accordingly, the higher voltage is applied to provide a more efficient cooling means when the heat-generating body radiates more heat.

Because neither Senda, Honda, Ishii, nor Nakano, taken singularly or in combination, teaches or suggests at least “a control means for one of increasing the signal amplitude of said sine wave oscillation means when the temperature of the heat-generating body is increased and decreasing the signal amplitude of the sine wave oscillation means when the temperature of said heat-generating body is decreased, based on the sensed temperature,” **claim 4** distinguishes patentably and unobviously over Senda, Honda, Ishii and Nakano.

Claim 5 recites features similar to, although not necessarily coextensive with, the features argued above with respect to claim 4. Therefore, arguments presented with respect to claim 4 are respectfully submitted to apply with equal force here. It is respectfully submitted that **claim 5** distinguishes patentably and unobviously over Senda, Honda, Ishii and Nakano, taken singularly or in combination.

Claim 6 recites features similar to, although not necessarily coextensive with, the features argued above with respect to claim 2. Therefore, arguments presented with respect to claim 2 are respectfully submitted to apply with equal force here.

Additionally, claim 6 recites, among other elements: “a second control means for adjusting the signal amplitude of said sine wave oscillation means in accordance with the sensed temperature of said temperature sensing means.”

The Examiner asserts that it would have been obvious to combine the control means of Nakano with the piezoelectric drive circuit of Senda for the benefit of providing additional compensation due to fluctuations in temperature. (*See* Office Action, page 4, last full paragraph).

There is no teaching, suggestion, or motivation to combine Senda with Nakano

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. Although a prior art device “may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.” *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

As discussed above, Senda teaches adjusting the motor frequency based on the sensed temperature of the motor. Nakano teaches increasing the amplitude or frequency of the voltage drive when the sensed temperature of the piezoelectric element is low and decreasing the amplitude or frequency of the voltage drive when the sensed temperature of the piezoelectric element is high. Therefore, Senda and Nakano both teach adjusting the frequency based on the sensed temperature of the motor. Accordingly, one of an ordinary skill in the art would not have looked into Nakano to modify Senda because a redundant apparatus having two control units to adjust the motor frequency based on the motor temperature read by two temperature sensors is neither practicable, nor desirable.

Additionally, Applicants submit that the Examiner's conclusion of obviousness is based on improper hindsight including only the knowledge gleaned from the Applicants' own disclosure and is not rooted in the prior art of record. However, "[i]mpermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art." (See MPEP § 2142).

It is not understandable (nor is the proper reasoning provided in the Office Action) why one skilled in the art would have desired so to modify Senda with Nakano to arrive at the subject matter of claim 6. The Examiner's rationale for modifying Senda with Nakano "for the benefit of providing additional compensation due to fluctuations in temperature" is flawed because each reference describes controlling the motor frequency based on the sensed temperature of the motor.

The Examiner provides no objective evidence substantiating his position. Such determination of obviousness is improper.

For at least these reasons, it is, therefore, respectfully submitted that **claim 6** distinguishes patentably and unobviously over Senda, Honda, Ishii and Nakano, taken singularly or in combination.

Claim 7 recites features similar to, although not necessarily coextensive with, the features argued above with respect to claims 2 and 6. Therefore, arguments presented with

respect to claims 2 and 6 are respectfully submitted to apply with equal force here. It is respectfully submitted that **claim 7** distinguishes patentably and unobviously over Senda, Honda, Ishii and Nakano, taken singularly or in combination.

Claims 8-10 Distinguish over Cited Prior Art

Claims 8-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Senda in view of Honda, further in view of Ishii, and further in view of Katsumi.

Claim 8 recites features similar to, although not necessarily coextensive with, the features argued above with respect to claim 1. **Katsumi** does not cure any deficiencies of Senda, Honda and/or Ishii. Therefore, arguments presented with respect to claim 1 are respectfully submitted to apply with equal force here. It is respectfully submitted that **claim 8** distinguishes patentably and unobviously over Senda, Honda, Ishii and Katsumi, taken singularly or in combination.

Claim 9 recites features similar to, although not necessarily coextensive with, the features argued above with respect to claim 2. **Katsumi** does not cure any deficiencies of Senda, Honda and/or Ishii. Therefore, arguments presented with respect to claim 2 are respectfully submitted to apply with equal force here. It is respectfully submitted that **claim 9** distinguishes patentably and unobviously over Senda, Honda, Ishii and Katsumi, taken singularly or in combination.

Claim 10 recites features similar to, although not necessarily coextensive with, the features argued above with respect to claim 2. Therefore, arguments presented with respect to claim 2 are respectfully submitted to apply with equal force here. **Katsumi** does not cure any deficiencies of Senda, Honda and/or Ishii. It is respectfully submitted that **claim 10** distinguishes patentably and unobviously over Senda, Honda, Ishii and Katsumi, taken singularly or in combination.

Claims 11-14 Distinguish over Cited Prior Art

Claims 11-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Senda in view of Honda, further in view of Ishii, further in view of Nakano, and further in view of Katsumi.

Claim 11 recites features similar to, although not necessarily coextensive with, the features argued above with respect to claim 4. Therefore, arguments presented with respect to claim 4 are respectfully submitted to apply with equal force here. **Katsumi** does not cure any deficiencies of Senda, Honda, Nakano and/or Ishii. It is respectfully submitted that **claim 11** distinguishes patentably and unobviously over Senda, Honda, Ishii, Nakano and Katsumi, taken singularly or in combination.

Claim 12 recites features similar to, although not necessarily coextensive with, the features argued above with respect to claim 4. Therefore, arguments presented with respect to claim 4 are respectfully submitted to apply with equal force here. **Katsumi** does not cure any deficiencies of Senda, Honda, Nakano and/or Ishii. It is respectfully submitted that **claim 12** distinguishes patentably and unobviously over Senda, Honda, Ishii, Nakano and Katsumi, taken singularly or in combination.

Claim 13 recites features similar to, although not necessarily coextensive with, the features argued above with respect to claims 2 and 6. Therefore, arguments presented with respect to claims 2 and 6 are respectfully submitted to apply with equal force here. **Katsumi** does not cure any deficiencies of Senda, Honda, Nakano and/or Ishii. It is respectfully submitted that **claim 13** distinguishes patentably and unobviously over Senda, Honda, Ishii, Nakano and Katsumi, taken singularly or in combination.

Claim 14 recites features similar to, although not necessarily coextensive with, the features argued above with respect to claims 2 and 6. Therefore, arguments presented with respect to claims 2 and 6 are respectfully submitted to apply with equal force here. **Katsumi** does not cure any deficiencies of Senda, Honda, Nakano and/or Ishii. It is respectfully submitted that **claim 14** distinguishes patentably and unobviously over Senda, Honda, Ishii, Nakano and Katsumi, taken singularly or in combination.

New Claims

To provide more varied protection, Applicants add new claims 15-18 which are patentable at least by virtue of their dependencies and additional features set forth therein. Support for claims 15-18 might be found in the specification, for example, on page 11, lines 15-23.

No new subject matter has been entered.

CONCLUSION

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


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